



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Contribution ID: 363

Type: **Poster Presentation**

Electrical Properties of $\text{Mn}_{0.5}\text{Co}_{0.5}\text{Fe}_2\text{O}_4$ Nanosized Synthesized Via High-Energy Milling technique

Thursday, 12 July 2012 17:30 (2 hours)

Abstract content
 (Max 300 words)

$\text{Mn}_{0.5}\text{Co}_{0.5}\text{Fe}_2\text{O}_4$ sample was produced from high-purity metal oxides by high-energy ball milling method. Single-phase cubic spinel structure of the synthesized sample was confirmed by X-ray diffraction (XRD). The results show that the as-prepared sample had an average grain size of about 8 nm. Bulk samples in the form of pellets were also produced from the as-prepared sample for resistivity measurements. The temperature dependence of the electrical resistivity for samples sintered from 600 - 1100 deg;C under argon atmosphere were studied using the four-probe method from room temperature to about 110 deg;C. Two possible mechanisms for resistivity involving T^{-1} and $T^{-1/2}$ dependences were investigated which we associated with semiconducting and inter-grain conductivity respectively. The $T^{-1/2}$ dependence is found to fit the data better and predicts higher activation energies. The resistivity was observed to be sensitive to the surface of the pellet being probed and the annealing temperature.

Apply to be
 consider for a student
 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD)?

PhD

Main supervisor (name and email)
and his / her institution

Thomas Moyo, Moyo@ukzn.ac.za, School of Chemistry and Physics, Westville campus, University of KwaZulu-Natal

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Mr ABDALLAH, HAFIZ M. I. (School of Chemistry and Physics, Westville Campus, University of KwaZulu-Natal, Private Bag X54001, Durban 4000, South Africa)

Co-author: Dr MOYO, THOMAS (School of Chemistry and Physics, Westville Campus, University of KwaZulu-Natal, Private Bag X54001, Durban 4000, South Africa)

Presenter: Mr ABDALLAH, HAFIZ M. I. (School of Chemistry and Physics, Westville Campus, University of KwaZulu-Natal, Private Bag X54001, Durban 4000, South Africa)

Session Classification: Poster Session

Track Classification: Track A - Division for Condensed Matter Physics and Materials